

ABSTRACT OF THE DISCLOSURE

A gyroscopic system for translating parallel and non-parallel lines between a reference line and a device to be aligned with respect to the reference line is provided. The system includes a first inertial sensor configured to be substantially stationary, the first inertial sensor comprising a first three-axis gyroscopic sensor configured to produce an output signal and a reflector. A second inertial sensor is configured to be portable so as to be positionable adjacent to the first inertial sensor and comprises a gimbal restricted to two physical axes, a gimbal drive system, an electromagnetic energy beam generator, a second three-axis gyroscopic sensor configured to generate an output signal, and a collimator. The collimator is operable to determine an angle between a beam projected by the beam generator and a beam reflected from the reflector and to generate an output signal indicative of the determined angle. A control circuit is operable to process output signals generated by the collimator and the first and second three-axis gyroscopic sensors and determine relative orientations of the first and second inertial sensors with respect to each other.

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